

**S5 Table. Sequences retrieved from GenBank for comparison between commonly used markers and markers amplified with primer pairs developed in this study.**

Species*	GenBank ID*	Locus*	used for*	Species	GenBank ID	Locus	used for
<i>Aethionema saxatile</i>	GQ284853.1	ITS	family	<i>Cardamine hirsuta</i>	HM850748.1	matK	lineage
<i>Aethionema saxatile</i>	EU371817.1	matK	family	<i>Cardamine hirsuta</i>	HQ616529.1	ndhF	lineage
<i>Aethionema saxatile</i>	DQ288726.1	ndhF	family	<i>Cochlearia officinalis</i>	HQ268642.1	ITS	family
<i>Arabidopsis thaliana</i>	AJ232900.1	ITS	family	<i>Cochlearia officinalis</i>	JN895761.1	matK	family
<i>Arabidopsis thaliana</i>	DQ528813.1	ITS	lineage	<i>Cochlearia officinalis</i>	AY514390.1	ndhF	family
<i>Arabidopsis thaliana</i>	AF144378.1	matK	lineage	<i>Diplotaxis tenuifolia</i>	EF601913.1	ITS	family
<i>Arabidopsis thaliana</i>	AF144378.1	matK	family	<i>Diplotaxis tenuifolia</i>	HE967405.1	matK	family
<i>Arabidopsis thaliana</i>	JQ323085.1	ndhF	family	<i>Draba aizoides</i>	GU202434.1	ITS	genus
<i>Arabidopsis thaliana</i>	JQ323085.1	ndhF	lineage	<i>Erysimum perofskianum</i>	DQ406762.1	matK	lineage
<i>Arabis alpina</i>	AF137559.1	ITS	family	<i>Hesperis matronalis</i>	DQ357547.1	ITS	family
<i>Arabis alpina</i>	DQ060111.1	ITS	genus	<i>Hesperis matronalis</i>	HQ593319.1	matK	family
<i>Arabis alpina</i>	KC474054.1	matK	family	<i>Hesperis matronalis</i>	DQ288776.1	ndhF	family
<i>Arabis caerulea</i>	JQ919837.1	ITS	genus	<i>Hornungia alpina</i>	DQ310527.1	ITS	family
<i>Arabis ciliata</i>	FJ187950.1	ITS	genus	<i>Hornungia petraea</i>	JN893991.1	matK	family
<i>Arabis jacquini</i>	AJ232919.1	ITS	genus	<i>Hornungia petraea</i>	KF023023.1	ndhF	family
<i>Arabis pumila</i>	KC412276.1	ITS	genus	<i>Iberis amara</i>	AJ440311.1	ITS	family
<i>Barbarea vulgaris</i>	AJ232915.2	ITS	lineage	<i>Iberis amara</i>	GQ424589.1	matK	family
<i>Barbarea vulgaris</i>	HQ593190.1	matK	lineage	<i>Iberis amara</i>	AY514391.1	ndhF	family
<i>Barbarea vulgaris</i>	AF064652.1	ndhF	lineage	<i>Kernera saxatilis</i>	AJ440313.1	ITS	family
<i>Biscutella laevigata</i>	DQ452056.1	ITS	family	<i>Lepidium campestre</i>	AF055197.1	ITS	family
<i>Biscutella laevigata</i>	KF022694.1	ITS	lineage	<i>Lepidium campestre</i>	AF055197.1	ITS	lineage
<i>Biscutella laevigata</i>	KF023014.1	ndhF	lineage	<i>Lepidium campestre</i>	HQ593342.1	matK	lineage
<i>Biscutella neustriaca</i>	JN987160.1	matK	family	<i>Lepidium campestre</i>	HQ593342.1	matK	family
<i>Biscutella neustriaca</i>	JN987160.1	matK	lineage	<i>Lepidium campestre</i>	JQ323087.1	ndhF	family
<i>Boechera canadensis</i>	DQ165348.1	ITS	lineage	<i>Lepidium campestre</i>	JQ323087.1	ndhF	lineage
<i>Boechera drummondii</i>	AF064658.1	ndhF	lineage	<i>Matthiola incana</i>	HM850753.1	matK	family
<i>Brassica incana</i>	KF023015.1	ndhF	family	<i>Matthiola incana</i>	KF023009.1	ndhF	family
<i>Brassica nigra</i>	AY722422.1	ITS	family	<i>Matthiola parviflora</i>	DQ357568.1	ITS	family
<i>Brassica nigra</i>	JN894593.1	matK	family	<i>Rorippa gambelii</i>	AF198154.1	ndhF	lineage
<i>Brassica nigra</i>	DQ200031.1	ndhF	family	<i>Rorippa palustris</i>	KC133366.1	ITS	lineage
<i>Braya humilis</i>	AY353124.1	ITS	family	<i>Rorippa palustris</i>	JN966508.1	matK	lineage
<i>Braya humilis</i>	KC474211.1	matK	family	<i>Thlaspi arvense</i>	HQ593466.1	matK	family
<i>Braya rosea</i>	DQ288743.1	ndhF	family	<i>Thlaspi arvense</i>	DQ288839.1	ndhF	family
<i>Cardamine hirsuta</i>	DQ268385.1	ITS	lineage	<i>Thlaspi caerulescens</i>	DQ337377.1	ITS	family

\*Locus refers to the amplified region, the use of each accession is divided into Family, "lineage" and genus, which refer to the three taxonomic levels that were tested.